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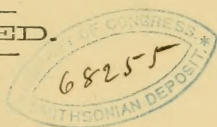
AN ADDRESS
ON THE
Natural History and Pathological Osteology
OF
THE HORSE,

DELIVERED BEFORE
THE ANNUAL MEETING

OF THE
Connecticut Board of Agriculture,
AT MIDDLETOWN, JANUARY, 1870,

By N. CRESSY, M. D.

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The Natural History and Pathological Osteology

OF

THE HORSE.



BY N. CRESSY, M. D.

Lecture delivered January 14th, 1870.

The horse, in all ages of the world, has been the esteemed servant of man both in war and in peace. And to the scientific inquirer it is also an object of interest. For this noble creature and its allied species, not only afford the veterinarian an opportunity of investigating certain rare phenomena of disease otherwise unknown in the history of the Healing Art, but they enable the naturalist to study the inti-

mate relations which these few surviving species hold to their fossil ancestors, whose remains are profusely strewn in the diluvial strata of the earth.

The domestic horse, zoologically speaking, is known as the *Equus caballus*, and was classed by Cuvier with the other thick-skinned and non-ruminating mammals in that comprehensive order *Pachydermata*; but which Professor Owen has very justly subdivided on account of the three-fold variety in the special details of structure thus included, and has placed the horse together with all those hoofed animals which have an odd number of toes, either one or three, in his well-chosen order *Perissodactyla*, in contradistinction to his even-toed order, *Artiodactyla*, to which our cattle, deer, sheep, and swine belong.

The two preceding orders will be found, by a careful analysis, to constitute a natural and well-marked anatomical division of all the hoofed quadrupeds, both recent and fossil. In view of which fact, naturalists have endeavored to trace the ancestry of our equine and bovine races back to the ancient *prototypes* of these two orders, which flourished extensively during an earlier epoch of creation.

But in passing we would observe that though the Gnu or "horned-horse" of Africa, very much resembles the wild prairie horse in its general bodily conformation, yet it is found, by a moment's inspection, to have a divided hoof and all the characteristic features of the antelope family, to which it belongs.

The history of the horse-family is veiled in remote antiquity. Fossil remains of several extinct, but closely allied species, have been found in the Tertiary deposits on both sides of the Atlantic.

There is a fossil skull of an extinct horse, *Equus nomadicus*, in the British Museum, taken by Messrs. Falconer & Cautley from the Miocene formations in the Sewalk Mountains of India, associated with the remains of gigantic Pachyderms, Ruminants, and other extinct mammals, showing that the horse in its *paleontological* lineage antedates the lapse of historic time. But the most ancient representative of the fossil

horse was undoubtedly the *Equus primigenius* of Meyer, and which was also called *Hippotherium gracile* by Wagner. It ranged from the Himalayas to the Alps, and existed from the Miocene period, geologically speaking, to the Diluvium, or the recent formations. The limbs of a fossil pony, if such we may call it, were discovered in the upper Tertiary clay of Nebraska, at Antelope Station, on the line of the Union Pacific Railroad, in 1868, which were carefully examined and described by Prof. O. C. Marsh, of New Haven, who believed that the restored skeleton of this species would not exceed two and a half feet in height; and therefore very appropriately named it *Equus parvulus*.^{*} This is the seventeenth species of fossil horse now known to have been indigenous to this continent. Numerous teeth and fragmentary portions of the so-called *Equus fossilis*, which undoubtedly included several species that were closely allied to the present horse, have been discovered in the *Drift* in various parts of Europe and America.

Thus it will be seen that the geographical distribution of the Equidæ in a former period of the earth's history, was very extensive in both hemispheres. But it is believed by Professor Owen, Darwin, and other distinguished naturalists, that this family had been entirely blotted out of the Fauna of our part of the globe ere the fall of the footstep of man had been heard. According to this view the horse became extinct in North America cotemporary with the Mammoth, and in South America with the Megatherium. For it is alleged that the remains of the primitive horses of the New World lie intermingled in the same geological strata with these huge quadrupeds, and no intermediate species are found in the later formations, thus intimating that the wild horses of to-day upon our pampas and prairies, were introduced here in the state of domestication by the Spanish colonies in the fifteenth century. While on the other hand it is claimed that the recent discoveries in Paleontology seem to indicate that

^{*}American Journal of Science and Arts, vol. XLVI, November, 1868.

See Owen's Palæontology, and his History of the British Fossil Mammalia, and also the article *Equidæ* in Knight's Cyclopædia of Natural History.

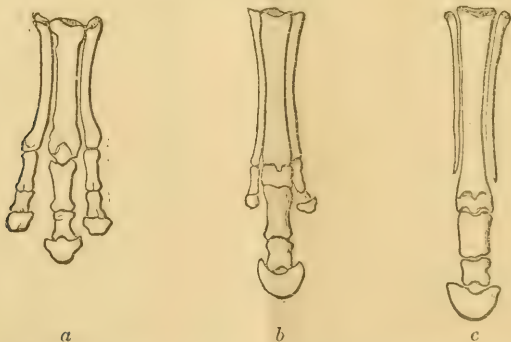
the equine race has been continuous upon the continent from the earliest fossil representatives of this type of animals to those of the present day. But further evidence will be required in order to decide such an important question. Yet we can see no valid reason why this race may not have continued here in the same unbroken series as it appears to have done in the Old World.

But naturalists are agreed that there is no aboriginal or truly wild breed of horses now known to exist in any part of the globe; and this is also corroborated by the observations of Oriental travelers, who believe that the wild horses of the East were once domesticated animals.

Hence we see that the origin of the domestic horse is veiled in great obscurity, and thus becomes one of the most interesting problems of Natural History. Thomas Bell, in his History of the British Quadrupeds, claims that the Egyptians were probably the first to break the proud spirit of this noble animal, and reduce it to obedience and servitude. While others believe that the primitive horse was first domesticated in Asia.

The horse, in its special details of structure, reverts to that primitive type of three-toed quadrupeds which appeared upon

Figure 1.



the earth among the earliest of the Tertiary mammals, and which have, therefore, been very fitly characterised as the *Paleotheria*, or ancient wild beasts. These animals walked

This plate is copied from Owen's Comparative Anatomy.
The feet of the Horse, *Hipparion* and *Paleotherium*.

upon their three toes, which correspond to the second, third, and fourth rows in the pentadactyle, or five fingered hand, as seen at Fig. 1 *a*. But these *Paleotheres* eventually faded away (at the close of the Eocene period), and were succeeded (in the Miocene) by another tri-dactylous quadruped, which, on account of its general resemblance to the horse, as shown by its fossil bones, has been called the *hipparion*. And, although this horse-like animal had three toes upon each foot, the same as its predecessors, yet upon the hard ground it really walked upon one, the same as the horse does, inasmuch as the outer toes had become considerably shortened, and reduced in size, as is seen at Fig. 1 *b*.

The dentition, as well as the close resemblance of the feet, point to a transitional position, which the *hipparion* must have occupied in the "survival of the fittest" between the *paleotheres* and the modern horse. And, believing that this same process of "derivative" modification may have been carried still further, we should ultimately expect to find a creature in which those outer toes were wholly wanting; and this is really the case in all the equine species. Fig. 1 *c*. "Thus the succession in time," says Professor Owen,* "accords with the gradational modifications by which *paleotherium* is linked on to *equus*."

Hence we see that the so-called "splint-bones," in the limbs of the horse are simply the rudiments of those lateral toes in the tridactyle feet of their ancient predecessors. But occasionally we find a horse with these supplementary ancestral hoofs. "In one of the latest examples," says Professor Owen,† "the inner splint-bone, answering to the second metacarpal of the pentadactyle foot, supported phalanges and a terminal hoof, in position and proportion to the middle hoof, resembling the corresponding one in *hipparion*."

Such examples of tridactyle feet in the horse, though usually regarded as "monsters," clearly illustrate the natural law of hereditary descent.

There is a great variety in the form of the limbs, or ambu-

* See his closing chapter on the Anatomy of Vertebrates, vol. iii.

† In his Comparative Anatomy and Physiology of Vertebrate Animals, vol. iii.

latory appendages of vertebrate animals. In the fin of the fish, which is analagous to the human arm, there is a multiplicity of rays, but higher in the series the number is reduced to five phalangial rows, of which the monodactyle foot of the horse is the lowest expression, and answers to the middle finger of the human hand.

The law by which these toes are lost is interesting to us, as well marked examples of such modifications are found in the domestic animals. The first to disappear is the thumb, then we have a four-toed foot like the hog and the deer. Next, the fifth row, or little finger is lost, and this leaves the tridactyle foot, which we have already considered.

Having thus briefly pointed out a few facts concerning the natural history of the horse, let us now turn our attention to another department of our subject, which, I trust, will be far more interesting to those who have the guardianship of this noble animal. But as it is not our mission on this occasion to treat of the general maladies of the equine system we will limit our inquiries to the pathological, or diseased conditions of the bones, and of some of the adjacent tissues.

Comparative anatomists have clearly shown that the entire series of vertebrate animals, including man, are built upon the same general plan of structure. The chemist has assured us that the bones of all animals are composed of the same proximate principles, or ingredients, though the relative quantities of these several principles vary considerably in the different types, orders, and species. And the physiologist has conclusively proved by his microscopic examinations that the blood of fishes, reptiles, birds, and mammals, contains the same anatomical granules and cells as is found in the blood of man. Now, in view of all these facts, why may we not suppose that the domestic animals are afflicted with the same diseases as we are, differing only in degree?

Upon this basis we shall inquire into the pathological osteology of the horse, though we do not expect to find all those loathsome diseases of the bones in the equine system which so frequently visit the frail body of mortal man.

The diseases of the bones may be divided into three classes. First, we will consider those diseased conditions which affect

the nutrition of the bones, and thus compromise the utility of the part. A healthy bone is composed of organic and inorganic matter, which is united in certain definite proportions though they relatively vary with age. In certain diseased conditions of the system there is a want of the earthy salts, phosphate and carbonate of lime, in the blood, and hence the bones are deprived of their solidity, and soon become distorted, as is seen in Rickets. But, on the other hand, there may be a surplus quantity of this earthy matter deposited in the bones, and thus render them extremely brittle, like the fragility of old age. Or an undue absorption of these earthy salts may take place, and a softened bone be the result. This disease is known as "*mollities osseum*," and though of rare occurrence either in the human or equine system, yet it is frequently seen in our New England cows in the form of "cripple ail," especially in our hill farms, where the soluble phosphates have become nearly exhausted from the soil. The desire which cows usually manifest in such localities to chew bones is a clear index to the kind of *fertilizers* which those lands most need. The free use of ground bone on such farms will effectually cure this *Osteomania*, and will also prove a potent remedy when mixed with the feed to restore this ~~fresh~~ *we* crippled condition of our milch cows.

Again, both the organic and inorganic elements may become partially absorbed, and thus constitute a case of *atrophy*, or perishing of the bone. But this disease is usually local in character.

The second class of bone diseases includes those which involve the tissue in a simple or scrofulous inflammation. But we will only notice under this division those two very common affections which are known to pathologists as *Necrosis* and *Caries*. The first of these, as the word implies, is the death of a bone or any part of it, attended by a regenerative process, established at the time coeval with the inflammation or injury which deprives it of vitality. In this respect it is a singular disease, and has nothing analagous to it in the affections of the soft parts. While *Caries* in its degenerative process is very similar to the ulceration of the muscular tissues.

In Necrosis a portion of bone dies, which is called a *sequestrum*, and is surrounded by living or germinal matter that will supply the place of this diseased portion when it shall have been removed by carious ulceration or by a surgical operation. Fortunately necrosis is a rare disease in the equine system, though very common, as we have before observed, in man. It presents a solitary example of an effort on the part of nature to counteract or provide against the ravages of disease. In this respect it becomes a very interesting subject of inquiry.

Exostosis is the principal disease in the third class that we shall attempt to describe on this occasion. And of all the organic maladies of the horse, this is, by far, the most common and the one, in view of cure, the most dreaded by the veterinarian. In its origin it is either *acute* or *hereditary*, and in both cases may be transmitted from generation to generation with increasing severity, and thus ultimately ruin the entire family stock.

By the term Exostosis we mean an extra bony growth, or tumor, which necessarily involves the periosteum or the covering of the bone. In this respect we shall radically differ from the views of Dr. Porter, who claims (in his article on the pathological conditions of bone, in the *Cyclopædia of Anatomy and Physiology*) that the periosteum is not affected in this disease, but we will not stop to discuss the matter here, for an appeal to the facts concerning its genesis will satisfy even the doubting mind of every earnest inquirer. In a case of acute exostosis, or where it is primarily developed without any hereditary predisposition on the part of the immediate parentage; this disease usually occurs as the result of an injury, either from a blow or a strain. An inflammation follows and an extra quantity of blood, laden with salts of lime, is brought to the part, and thus the periosteum and the surrounding tissues is thoroughly congested. Eventually the phosphate and carbonate of lime becomes deposited within the periosteum at the seat of injury, and a hard, unyielding, bony tumor is the inevitable result. In fact, *ringbone*, *splint*, and *spavin* are only different names of the result of this same morbid process of bony growth. All of these affections may

be developed from similar exciting causes or from an inherited constitutionality.

Every bone in the normal condition of nutrition grows large by the deposition of new material upon its external surface through the instrumentality of the periosteum. And

Figure 2.



"CHEST FOUNDER."

any agency which will increase the flow of blood to that part and thus unduly excite the action of this membrane, will cause this excessive and morbid production of bone. But there is evidently a certain peculiarity in the general nutrition of the body, favorable to the production of this disease; for it is often seen, even fearfully developed, in the colt at an early age, where no external or exciting cause could have played its part. Such a condition of the system might well be termed, in the language of pathology, an *exostosis*.

Though every bone in the skeletal frame-work of the horse is liable to an attack of exostosis, yet the joints are the most frequently the seat of this disease. In rheumatism, or "founder," which usually involves the periosteum of the bones of the chest, you will occasionally find, upon post-mortem examination, that the lower end of the ribs and their appendages are affected with this same malady. At Figure 2 will be seen a case of "chest-founder," so called, in which the first and second ribs of the right side are firmly grown together, and are attached by a bony union to the first rib of the opposite side. This specimen was taken from a horse thirty years of age, which was noted for its general usefulness, yet we imagine that this creature must have suffered in its respiratory functions, inasmuch as the anterior part of the thorax, or chest, was a solid bone hoop. May not this form of the disease ac-

count for many cases of "heaves," "short-breath," &c. ? Such a case would not be amenable to any treatment, unless taken in hand early and with a clear conception of the approaching malady.

Ringbone derives its name from the peculiar form which this morbid growth of bone assumes when it attacks the pastern joint ; a well marked example of which will be seen in

Figure 3.



RINGBONE.

the plate at Figure 3. The incidental causes of ringbone are very numerous. Almost any injury received upon the pastern bone may give rise to a more or less aggravated form of this disease, if not promptly attended to, with perfect rest secured for the animal. Such cases should be freely treated with

Figure 3.—Ringbone; *a*, upper pastern; *b*, lower pastern; *c*, coffin bone.

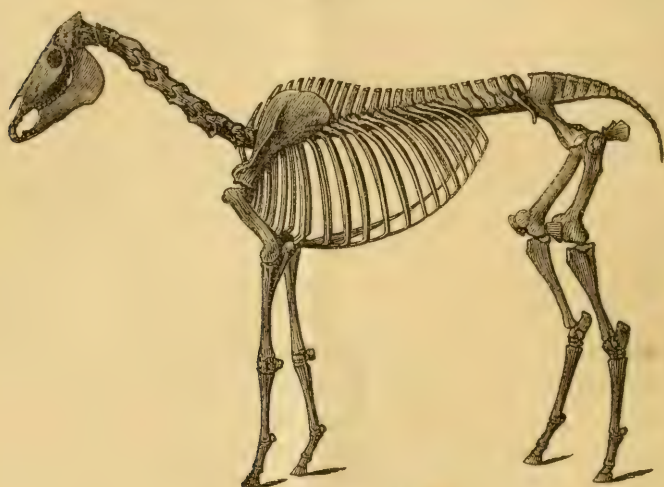
quieting and cooling lotions, in view of arresting the congestion or extra flow of blood to the part, that inevitably follows, as the result of injury, and which causes the swelling, heat, and pain so grievous to be borne by the poor afflicted animal. And as a remedy to alleviate the suffering and control the progress of the disease, I would earnestly recommend a preparation of Colorless Iodine Liniment that I have used for several years with marked success in human and veterinary practice. Cases of hereditary ringbone that appear early in a colt need no treatment, for their only cure consists in hastening the *anchylosis* of the joint, which, of course, forever obliterates the freedom of motion there, by soldering the two articulating bones together in firm osseous union. Even with such a cure the creature ceases to limp, because the impaired motion of the joint that caused such excruciating pain in walking has been destroyed. And though a horse with such an impediment would readily stumble, and thus be worthless for the turf, yet with careful usage upon light draft it may be serviceable for many years.

Percival divides the causes of ringbone into three classes, as follows, "hereditary, structural, and incidental"; the first and last of which we have already noticed, and the second we will now consider. Though the feet and limbs of all the equine family contain the same number of muscles and bones, yet the form and arrangement of these parts are not always the same in all the various breeds. In the race-horse the pastern bones stand quite obliquely, as is seen in the Eclipse at Figure 4, in order that the foot will rebound from the turf with an elastic spring when vieing for the goal. Such constructed feet are not commonly the seat of ringbone, inasmuch as the weight of the body is not directly felt upon the coffin-bones. But on the other hand, when the pasterns are nearly erect, the heft of the body in the act of trotting, falls as a dead weight upon the bones of the feet, and thus a constant irritation is kept up in the periosteum of the part, until a ringbone is the result. Horses with such formed feet should be *carefully* used, and then, *never* upon the pavements. Such examples illustrate that *hereditary predisposition* to ringbone,

splint, and spavin, which should ever be avoided in choosing your breeding stock.

That disease which is known as "*splint*" is of very common occurrence, and yet it is not grave in its consequences when not complicated by other diseases. It is very simple in

Fig. 4.



"ECLIPSE." *

its nature, origin, and treatment; and consists in the growing of the splint-bone on to the cannon-bone by this same morbid process of exostosis, which is usually the result of an external injury.

The hind and forward limbs are alike subject to this disease.

"Splint" seldom occasions much lameness, except in its primary stage, when the cushion of fibro-cartilage that is interposed between the splint and cannon-bones becomes involved in an ossific inflammation. But when these parts are firmly united in bony union, no further pain or lameness will be experienced by the creature. At this stage of the disease treatment of course is useless; but in the commencement give the horse rest and apply cooling lotions to allay the inflammation.

In a case of long standing, and even in one having a well-

*Photographed from the plate in Gamgee & Law's Veterinary Anatomy

marked tumor, the pain and lameness may be relieved by the moderate application of the *tincture of cantharides*. But some cases will not recover until the *Blister* has been applied, when that intervening cartilage will be converted into bone; then the cure is done.

When exostosis attacks the tarsus or instep just below the hock-joint, it is called *spavin*. The first symptoms in this form of the disease are not usually recognized in their true light, and the horse is urged on in its daily toil until the pain becomes so excruciating that the poor creature can no longer endure such suffering. In a majority of cases this disease occurs from hereditary transmission. It is more frequent than ringbone, inasmuch as its predisposition is more easily awakened by an exciting cause.

The six bones of the tarsus are separated from each other by a layer of inter-articulating cartilage, and the undue pressure which is brought to bear upon this part of the limb when the horse is heavily laden upon the ascending pavement, causes more or less irritation, and thus congestion and inflammation ensues.

The first two tarsal bones that grow together in this disease are those which anatomists have called the *scaphoid* and the *entocuneiform*. In fact it is rare to find an old dray-horse in which these bones are not consolidated in one, even when there is no sign of disease among the other tarsal bones. But if the disease is not arrested here, either by a resolution of Nature or by treatment, it usually involves the adjoining parts in the same inflammation, and thus ultimately *anchylose* the entire tarsus, together with two splints and the cannon-bone, in firm and indissoluble union. Such a case is beyond the help of the Healing Art, and any attempt to "cure" will exhibit the ignorance or deception of its vain pretender.

The general plan of treatment for Spavin is the same as for Ringbone and other forms of exostosis. In the early stage of the disease is your *only* hope of cure. But when the disease has advanced to that degree where new bone begins to be formed within the cartilage and periosteum, it is hard to be controlled: even then it may be partially arrested in its

progress by the free use of iodine and counter-irritants, such as the different preparations of Spanish Flies.

Blistering is a potent agent in judicious hands, but it must not be used indiscriminately; for many of its supposed cures are nothing but an *anchylosis* of the joint, as was seen in the case of the "cured" Ringbone, Figure ~~A~~. 3

The old adage that "an ounce of prevention is worth more than a pound of cure," is constantly verified in stock raising. And here let me impress upon your minds that the only way to ameliorate this diseased condition of the horse is to breed from pure blooded animals, and occasionally interchange with foreign stock.

Whenever it is your unhappy lot to have one of these poor afflicted creatures, treat it with kind and humane care. And be not imposed upon by the pretending "Horse Doctor," who perchance may happen at your door, and earnestly assure you that by the extracting of a certain "bladder" from the horse's foot the Ringbone will be forever cured. Believe it not, for it is a baseless imposition.

Neither listen to him who talks of a "leakage of the joint," and attempt to cure accordingly, for such assertions have no foundation whatever.

The nature, cause, and general treatment of all these afflictions have now been briefly indicated; and henceforth it remains for you to imbibe the useful and the good and apply it to practice.

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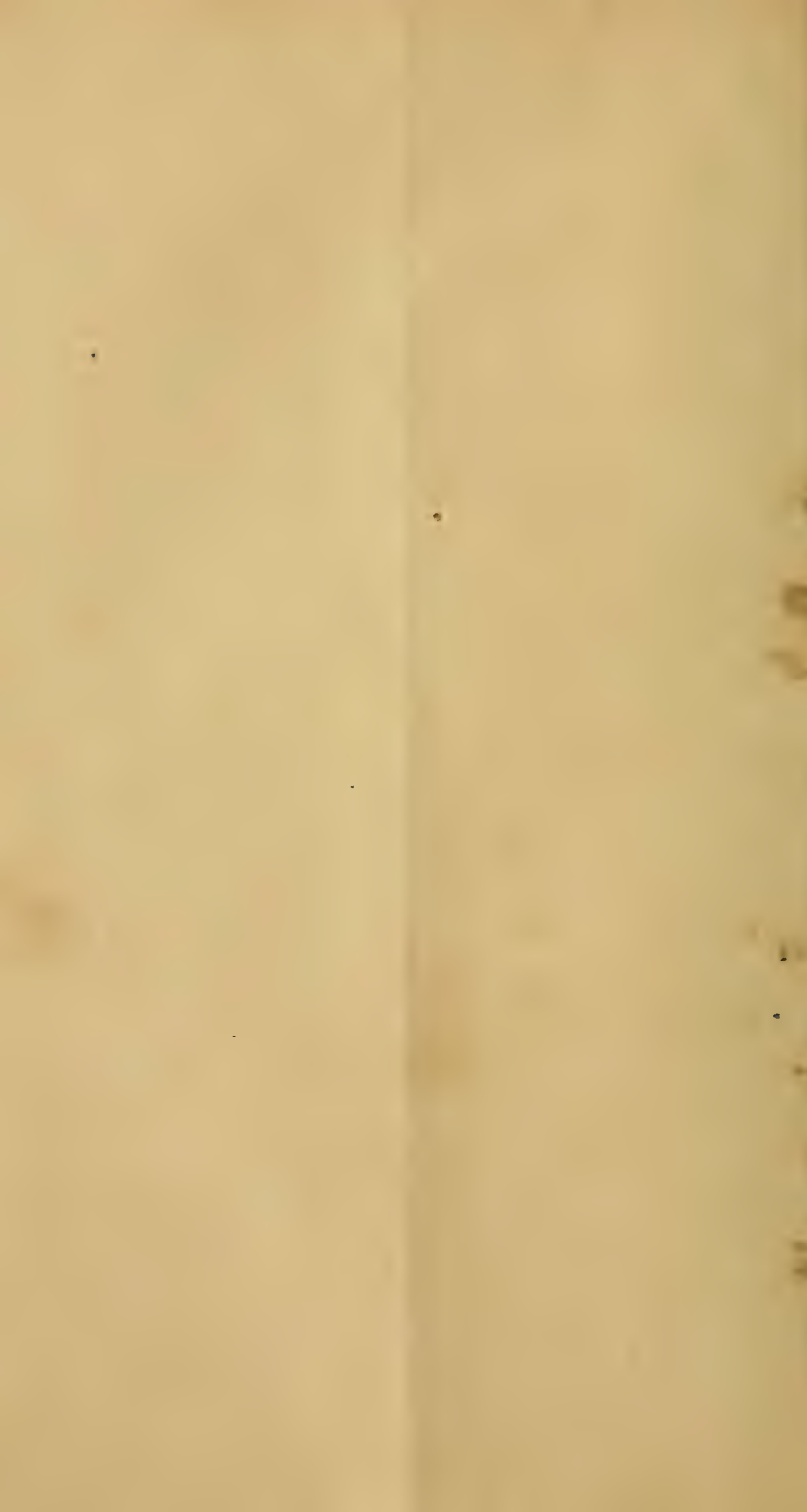
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